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ABSTRACT

A topic of increasing concern to scholars and policy makers is the degree of bias in estimates of the socioeconomic returns (occupational status and earnings) to schooling. This paper, based on a re-analysis of published data from seven sources and on new data, attempts to quantify the specification bias due to the omission of socioeconomic origins and mental ability from status and earnings functions. Conclusions are based on three sets of statistics: (1) the amount of explained variance in occupational status and earnings uniquely attributable to schooling: (2) the proportional reduction in socioeconomic returns to schooling controlling SES origins and/or mental ability; and (3) the reduced form and structural estimates for the two data sets available with indices of parental wealth. The results suggest that estimates of the occupational status returns to schooling are not seriously inflated, while those of earnings are overestimated by around 40 percent. Thus, the practice of calculating economic returns without adequate controls for ability and social origins is seriously questioned. This paper also suggests that an over concern with rates of returns to schooling--to the exclusion of other ascribed and achieved effects--obfuscates understanding of the socioeconomic achievement process. (Author/JM)

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SPECIFICATION BIASES IN ESTIMATES OF SOCIOECONOMIC RETURNS TO SCHOOLING

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Introductory Statement

The Center for Social Organization of Schools has two primary objectives: to develop a scientific knowledge of how schools affect their students, and to use this knowledge to develop better school practices and organization.

The Center works through three programs to achieve its objectives. The Schools and Maturity program is studying the effects of school, family, and peer group experiences on the development of attitudes consistent with psychosocial maturity. The objectives are to formulate, assess, and research important educational goals other than traditional academic achievement. The program has developed the Psychosocial Maturity (PSM) Inventory for the assessment of adolescent social, individual, and interpersonal adequacy. The School Organization program is currently concerned with authority-control structures, task structures, reward systems, and peer group processes in schools. It has produced a large-scale study of the effects of open schools, has developed the Teams-Games-Tournament (TGT) instructional process for teaching various subjects in elementary and secondary schools, and has produced a computerized system for school-wide attendance monitoring. The School Process and Career Development program is studying transitions from high school to postsecondary institutions and the role of schooling in the development of career plans and the actualization of labor market outcomes.

This report prepared by the School Process and Career Development program examines the degree of bias in estimates of the socioeconomic returns (occupational status and earnings) to schooling.

ABSTRACT

A topic of increasing concern to scholars and policy makers is the degree of bias in estimates of the socioeconomic returns (occupational status and earnings) to schooling. This paper, based on a reanalysis of published data from seven sources and on new data, attempts to quantify the specification bias due to the omission of socioeconomic origins and mental ability from status and earnings functions. The results suggest that estimates of the occupational status returns to schooling are not seriously inflated, while those of earnings are overestimated by around 40 percent. Thus, the practice of calculating economic returns without adequate controls for ability and social origins is seriously questioned. This paper also suggests that an overconcern with rates of returns to schooling--to the exclusion of other ascribed and achieved status effects--obfuscates understanding of the socioeconomic achievement process. A more complete understanding of this process depends on considerations other than schooling returns.

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Introduction

Since the original work of Becker (1964) and Mincer (1958), an enormous amount of economic and sociological research has been devoted to estimating the returns to "investments in human capital." Such investments have been conceptualized in a variety of ways, migration, work experience and on-the-job training, for example, but the most researched skill-producing activity has been schooling. The amount of schooling attained by individuals may be the most easily manipulable of all investments and, as Bowles (1972) observes, may be the most politically viable option for achieving greater social equality. Formal educational attainment does enchance the earnings potential of individuals: for white men aged 45-54 of non-farm orgin, each additional year of schooling is worth around $755 (calculated from data presented in Duncan, Featherman, and Duncan, 1972:38). A recurring problem in interpreting such results, however, concerns possible specification biases in the estimation process. That is, the coefficient attached to schooling may include not only legitimate "returns" but also the effects of variables not included in earnings functions. This problem is hardly unique to estimating rates of return to education, but economists have been particularly concerned about the effects of an omitted "mental ability" variable.

Individuals who are of higher ability tend not only to acquire more schooling but also more earnings. To the extent that ability directly (i.e.; net of education) affects earnings or other adult socioeconomic achievements, and ability is not included in the earnings equation, the returns to schooling will be overestimated. Although heavily researched, evidence regarding the extent of specification bias due to the omission of ability from earnings functions is equivocal.

Some studies (Rogers, 1969; Griliches, 1970; Griliches and Mason, 1973; Ashenfelter and Mooney, 1968; Weisbrod and Karpoff, 1968) report that the upward bias in returns to educational attainment is marginal in importance, while others (Denison, 1964; Taubman and Wales, 1972, 1973; Hause, 1972; Hansen, Weisbrod, and Scanlon, 1970; Sewell and Hauser, 1975) suggest that the bias is too important to ignore.[1] Much of this ambiguity may spring from differences in and pecularities of the populations sampled (see also Gintis, 1971).

While there is little agreement among researchers concerning the importance of the omission of mental ability, the potential bias is well known and widely discussed. The same cannot be said of the potential bias resulting from the exclusion in earnings functions of socioeconomic status (SES) origins. SES origins are routinely neglected as direct determinants of earnings by economists, though their importance for educational attainment is noted (see, especially, the discussion by Becker, 1972). Recently, however, Bowles (1972, 1973) has suggested that social class is much more influential and schooling less efficacious in the determination of earnings or income than previously believed. He observes that socioeconomic origins are not adequately specified by father's education and father's occupation[2] -- the most frequently used measures of SES origins--and are subject to severe errors of measurement. Both problems--inadequate conceptualization and measurement of SES origins or social class--leads to the attenuation of SES origin effects on earnings and to an artifactually inflated estimate of the returns to schooling. Adequate measurement and specification of socioeconomic origins, including measures of parental wealth and income, would, according to Bowles, result in the following: (1) the attainment of schooling would be shown to be more heavily dependent on class background than previous empirical

investigations indicate; (2) SES origins would register reasonably strong unmediated effects on earnings and the coefficient attached to schooling would be noteably lower;and (3), because of (1) and (2) above, schooling would be found to function primarily to transmit the effects of SES origins on, rather than uniquely enhance and induce variation in, adult socioeconomic achievement. If supported, Bowles's hypotheses would seriously question the assumption that the attainment of schooling is the "great equalizer" in American society.

Bowles's thesis has not been thoroughly tested because most data sets do not have the requisite measures (on parental income, for example). Bowles (1972, 1973), Bowles and Nelson (1974), and Duncan, Featherman, and Duncan (1972) were forced to use hypothetical correlations involving parental income due to a paucity of data. Their results, therefore, are suggestive but unverified. Several studies (Spaeth, 1973; Griliches and Mason, 1973; Blinder, 1973; Jencks, et al. 1972; Link and Ratledge, 1975; Duncan, 1968; Duncan, Featherman, and Duncan, 1972; Featherman, 1972; Coleman, Berry, and Blum, 1972; Dickinson, 1974) do report the direct dependency of earnings or income on the traditional indicators of SES origins (father's occupation and education), net of other explanatory variables. The not-too-surprising results generally indicate small or nonsignificant effects. This is consistent with Bowles's position. Two recent studies (Sewell and Hauser, 1972, 1975; Alexander, Eckland, and Griffin, 1975) report, however, that indicators of parental wealth do directly and significantly affect earnings, controlling for a variety of other variables, including educational attainment and occupational status. Thus, while Bowles's thesis has received partial support, few of these studies have attempted to quantify the bias in returns to schooling due to the omission of SES origins (the exceptions are Sewell and Hauser, 1975 and Griliches and Mason, 1973).

In this paper I will reanalyze previously published data and present new data with the aim of more systematically assessing the consequences of the possible specification biases discussed above than has hithertofore been done. Almost all of the studies cited above have examined the specification bias in earnings equations; I will expand the focus of the inquiry to include occupational status returns in addition to purely economic returns to schooling. Finally, I will attempt to determine the severity of the bias under different conditions concerning the inclusion or exclusion of mental ability or SES origins. Moreover, where data permit, I will reexamine the same questions with expanded indices of socioeconomic origins, which include parental income, to ascertain the plausibility of Bowles's (1972) argument.

Before continuing, one point deserves emphasis. The issues raised by this body of literature are neither merely scholarly debates over the "correctness" of an esoteric model of social process nor an academic game, as Welch (1975) seems to imply. The implications of research on the "payoffs" to schooling often have profound implications for social policy. For example, research with this conceptual paradigm has been used to study economic discrimination against blacks and women and to determine the differential effects of schooling for blacks and whites. Most of this research in the "human capital" tradition, however, has been based on data which do not include either ability or SES origins, such as the Census Bureau's 1960 and 1970 Public Use Samples and the 1966 and 1967 Survey of Economic Opportunity. This includes some of the most widely cited literature in the field (Hanoch, 1967; Weiss, 1970; Harrison, 1972; Welch, 1973; Mincer, 1974). New research is being conducted and published from these same data sources on highly political and important issues (Masters, 1974; Stolzenberg, 1975; Osterman, 1975; Haworth, Gwartney, and Haworth, 1975).[3] If the bias in returns to schooling

is truly trivial, researchers can approach these data banks with renewed confidence that their conclusions are reasonably accurate and will stand the test of time. If, on the other hand, the bias is shown to be important, then we may have to reconsider the findings and policy implications of a good deal of otherwise excellent research.

A Basic Model of Socioeconomic Achievement

My recursive model of socioeconomic achievement is consciously limited and consists of the following four equations (where all variables are assumed to be in standard form).[4]

(1) $\text{ABILITY} = \beta_1 \text{SES} + e_1$

(2) $\text{EDUCATION} = \beta_2 \text{SES} + \beta_3 \text{ABILITY} + e_2$

(3) $\text{OCC. STATUS} = \beta_4 \text{SES} + \beta_5 \text{ABILITY} + \beta_6 \text{EDUCATION} + e_3$

(4) $\text{EARNINGS} = \beta_7 \text{SES} + \beta_8 \text{ABILITY} + \beta_9 \text{EDUCATION} + \beta_{10} \text{OCC. STATUS} + e_4$

In addition to these equations, I will estimate equation (5) below, which assesses the total effect of schooling--directly and indirectly through the placement of men in the occupational status hierarchy--on earnings (Lewis-Beck, 1974; Alwin and Hauser, 1975).

(5) $\text{EARNINGS} = (\beta_7 + \beta_{10}\beta_4)\ \text{SES} + (\beta_8 + \beta_{10}\beta_5)\ \text{ABILITY} + (\beta_9 + \beta_{10}\beta_6)\ \text{EDUCATION} + e_5$

and let me define $(\beta_9 + \beta_{10}\beta_6)$ as β_{11}.

I should also note that the variable "SES" is employed in these equations for expository purposes only. In the actual analyses, I estimate the separate effects of multiple status origin variables.

This structural model is based on the work of Duncan (1968; Duncan, Featherman, and Duncan, 1972) and Sewell and Hauser (1975). Such a model purports

to "exhaust the influence of fundamental conditions of ascription and achievement" (Sewell and Hauser, 1975:184) and establishes concerns over and above returns to schooling.

Let me hypothesize that equations (1) through (5) represent the "true" model, but the model estimated is

$$(6)\quad \text{ABILITY} = \beta_1 \text{SES} + e_1$$

$$(7)\quad \text{EDUCATION} = \beta_2 \text{SES} + \beta_3 \text{ABILITY} + e_2$$

$$(8)\quad \text{OCC. STATUS} = \beta_6 \text{EDUCATION} + u_1$$

$$(9)\quad \text{EARNINGS} = \beta_{11} \text{EDUCATION} + u_2$$

Equations (6) and (7) are identical to (1) and (2) above. Equations (8) and (9) differ from (3) and (5), however, in that SES and ability are no longer allowed to directly affect socioeconomic achievement. This "false" model would result from the incorrect assumption (given knowledge of the true state of affairs) that education entirely mediates all of the influence of SES and ability on subsequent labor market success.

Estimation of (8) and (9) by ordinary least squares (OLS) will yield biased estimates of β_6 and β_{11} because in (8) education and u_1 and in (9) education and u_2 are correlated. In particular, the estimate of β_6 (say, b_6) will be

$$(10)\quad b_6 = \beta_6 + \beta_2 \beta_4 + \beta_5 \beta_3 + \beta_2 \beta_1 \beta_5 + \beta_4 \beta_1 \beta_3$$

Thus the OLS estimate of $\beta_6[b_6]$ will include β_ϵ, the "true" occupational status returns to schooling, plus the summation of the second through the fifth terms on the right side of (10). Given single equation estimation procedures (such as OLS), estimates of β_1, β_2 and β_3 will be identical for both models and in all probability positive. Thus it can be seen that the bias is entirely a function of the degree to which socioeconomic origins and mental ability directly determine occupational

status. If there is no direct SES effect on status $\beta_2 \beta_4 = \beta_4 \beta_1 \beta_3 = 0$ and the bias is reduced. If it is further demonstrated that ability exerts no independent status effects, then $\beta_3 \beta_5 = \beta_2 \beta_1 \beta_5 = 0$, and the bias entirely disappears. In that case, b_6 is an unbiased estimate of β_6. Clearly, then, quantification of the bias rests upon adequate specification and measurement of both mental ability and socioeconomic origins.[5]

Estimation of (9) will yield the following result.

$$(11) \quad b_{11} = \beta_{11} + \beta_2 \beta_7 + \beta_3 \beta_8 + \beta_2 \beta_1 \beta_8 + \beta_7 \beta_1 \beta_3$$

The remarks concerning (10) above are entirely appropriate for (11): β_{11} is biased to the extent that SES origins and mental ability directly influence earnings. See Appendix A for a complete exposition of the estimation of the bias.

Data and Variables

Table 1 summarizes the data and variables to be used in this paper. A more detailed description of the data is presented in Appendix B. All data pertain to men only. The first six data sources are national in scope, though the MICH-PANEL and EEO samples are not representative of all employed men in the United States.

Table 1 Here

My conclusions will be based on three sets of statistics: (1) the amount of explained variance in occupational status and earnings or income uniquely attributable to schooling. This statistic is necessary to fully explore Bowles' thesis; (2) the proportional reduction in socioeconomic returns to schooling controlling SES origins and/or mental ability; and (3) the reduced-form and structural estimates of the earnings equations for the WISC and EEO data, the

only data sets with indices of parental wealth.

Results

Schooling and Occupational Status

Table 2 presents two statistics for each entry in the table. The top statistic represents the variance in occupational status that can be uniquely attributable to schooling. It is calculated by subtracting the R^2 in occupational status generated by the equations which exclude schooling [SES (columns 1 and 2), ability (column 3), and SES and ability (columns 4 and 5)] from that generated by the corresponding equations which include schooling. The increment to R^2 is due to that portion of the variance in schooling which is orthogonal to SES origins and/or ability and it is the squared part correlation of schooling and occupational status (Linn and Werts, 1969). Clearly, this is a conservative estimate of the efficaciousness of schooling since all variance in labor market success attributable to the covariance of schooling, SES origins, and ability is allocated to the latter two regressors. The second statistic, in parentheses, is the proportion of the total explained variance in occupational status that is due to the unique effect of schooling.

Table 2 Here

Column 1 indicates the addition to R^2 due to schooling after first controlling father's occupation and father's education. While this statistic differs according to data set, from .034(CPS - NORC II, logged)[6] to .32 (PFS), the proportion of the total explained variance that is due to the unique contribution of schooling is much more stable. The figures in parentheses (in column 1) show that, with the exception of CPS - NORC II, between 53 and 76 percent of the total explained variation in occupational status is due solely to the unique effect

of schooling. Moreover, adding mother's education and parental income (in the WISC data set) and material possessions and parental income (in the EEO data set) as additional control variables (in column 2) hardly reduces this unique effect of schooling. From columns 1 and 2, I conclude that, insofar as occupational status achievement is concerned, educational attainment is an important mechanism for freeing men from their socioeconomic status origins, however such origins are measured.

The unique explanatory effect of schooling, after first controlling only mental ability, is presented in column 3. While the unique contribution of schooling is generally somewhat smaller than that registered in columns 1 and 2 (controlling for SES origins only), the differences are not great. Schooling still uniquely accounts for about 50-60 percent of the explained variation in occupational status (again excepting CPS - NORC II). The reduction in the unique contribution of schooling is, however, somewhat more marked if we first enter into the regression equation father's occupation, father's education, and mental ability (column 4). Estimates of the influence of schooling, net of its covariance with background and ability, is reduced to between a fifth (CPS - NORC II) to half (WISC) of the total variance explained in occupational status attainment. Addition of the auxillary indicators of socioeconomic status origins -- for the WISC and EEO data sets (column 5) -- leaves the results unchanged.

The robustness of this net schooling effect is impressive: even though controlling for three, and sometimes five, rather powerful determinants of educational attainment, schooling uniquely explains from a third to a half of the total explained variance in occupational status. This estimate of the "uniqueness" of schooling should be considered the absolute minimum amount of

influence attached to the attainment of formal education. Schooling does much more than simply signal the occupational structure that a man has the "right" social background or measured ability; indeed, it appears to operate so as to allow educationally certified men to partially overcome deficits in status origins or ability and to induce considerable variation in occupational status that is totally independent of social background.[7]

Table 3 presents the proportional reduction in occupational status returns to schooling after controlling socioeconomic origins and/or mental ability. This is the degree of specification bias and is estimated as

$$1 - \frac{b_{y,E \cdot C}}{b_{Y,E}},$$

where $b_{y,E \cdot C}$ is the partial slope of status on education (controlling either SES, ability or both) and $b_{y,E}$ is the bivariate slope. If the two slopes are

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Table 3 Here

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equal, the ratio is unity and the bias is zero.

The proportional reduction, controlling only father's occupation and father's education, is presented in column 1. It is observed that the bias in occupational status returns is small in all data sets, ranging from 6 (WISC) to 13-14 percent (NLS,CPS-NORC II,CPS-OCG 55-64). And, as in Table 2, further controlling for material possessions, parental income, and mother's education(in the EEO and WISC data) makes essentially no difference (column 2). As an example of the essential irrelevance of this bias, let me note that each additional year of schooling for the CPS-OCG 55-64 cohort (where the bias is the largest) is worth 3.8 status points before controls are added. After controlling for father's occupation and father's education, the status return to a year's

schooling is 3.30 points. Thus, if our interest was with the occupational status "payoff" of a college education versus that garnered by a high school education, assuming linearity of effects, the prediction would be biased upward by only 2 status points (15.2 points - 13.2 points). This is indeed inconsequential.

The overestimation of status returns to schooling due to the lack of controls for ability only is presented in column 3. The bias here is about the same as that presented in column 1 and is, again, trivial. Column 4 presents the degree of bias due to the omission of father's occupation, father's education, and mental ability. The bias is larger, on the order of 13 (WISC) to 20 percent (CPS-NORC II, NLS, CPS - NORC I). It is interesting to note that the bias due to SES origins (column 1) and the bias due to ability (column 3) are almost additive. This suggests that researchers attempting to estimate occupational status returns to schooling cannot control for either SES origins only or ability only and expect to account for the bias due to both. The covariance of socioeconomic origins and ability is too modest to use one as a proxy for the other (see Duncan, 1968).

Biases approaching 20 percent may, depending on one's perspective, appear either large or small. Several examples may enable us to conceptualize the impact of a bias of this size. Consider the bias of 14 percent obtained in the WISC data (column 5). This is the degree of specification bias due to the omission of the four status variables and ability. In the WISC data, an incremental year of schooling is worth, gross, 8.65 occupational status points. Net of the above variables, a year's education is worth 7.44 status points. The return to an investment in four years of college, for example, is worth 34.6 (gross) and 29.8 (net) status points, an inflated estimate of less than 5 status points. Consider now the 22 percent bias observed in the CPS-NORC II

study of veterans (row 7). As occupational status is logged, we can interpret returns to years of schooling in terms of percentage increments of occupational status. The gross status return to each additional year of schooling is worth 10 percent. After controlling for father's occupation, father s education, and ability (AFQT), a year's schooling yields an 8 percent return. The bias, then, is around 2 percent per year of schooling. In neither the WISC nor the CPS-NORC II data sets is the actual impact of the bias especially severe.

The results presented in Table 2 and Table 3, which are based on several sets of data on predominantly white males of a variety of ages, suggest that, if our concern is occupational status attainment, schooling functions largely to disengage men from unfavorable social backgrounds rather than to transmit the deletorious effects of these backgrounds. These results also indicate that estimates of the occupational status returns to educational attainment are only modestly inflated due to the omission of socioeconomic status origins (including indexes of parental income) and mental ability. The extent of the specification bias appears to be,at most, around 20 percent and this was shown to be of relatively minor importance in terms of actual status "payoffs."

I should note that these results do not imply that status origins have no direct consequences for status outcomes. For most of the data sets analyzed here, there does appear to be a modest degree of direct intergenerational occupational status "inheritance" (see Blau and Duncan, 1967; Duncan, Featherman, and Duncan, 1972; Sewell and Hauser, 1975; and Alexander and Eckland, and Griffin, 1975).

Schooling and Earnings[8]

The unique explanatory contribution of schooling on earnings (or income) is presented in Table 4. These statistics have the same interpretation as those presented in Table 2 for occupational status. Thus column 1 presents

the "unique" effect of education after first entering father's occupation and father's education into the earnings equation. We see, first of all, that schooling is much less effective in explaining variation in earnings than it is in explaining variation in occupational status. The percent of variation in earnings that can be uniquely allocated to schooling ranges from 2-3 (NLS, CPS-NORC II, EEO, WISC) to 15 percent (MICH). The MICH-PANEL study is clearly discrepant, on this finding, with the remaining data sets.

Table 4 Here

Of the total variance explained in earnings by father's occupation, father's education, and son's education, the proportion that is uniquely attributable to schooling ranges from around .3-.4 (CPS-OCG 35-44, CPS-OCG 45-54, EEO, NLS, CPS-NORC II) to .7 -.8 (WISC, MICH, PFS). With the exception of these latter three data sets, this unique proportion is about two-thirds as large as that registered for occupational status (compare the second statistic in the first column of Tables 2 and 4).

This unique proportion is reduced by half in those data sets which allow prior controls for, in addition to father's occupation and father's education, mother's education and parental income (WISC) and material possessions and parental income (EEO) (see column 2). The EEO results are particularly striking: only 16 percent of the total variation in annual earnings explained by the four status origin variables and schooling can be uniquely allocated to the latter variable. The results from both the WISC and EEO data sets suggest that the attainment of formal education does not generate earnings later in the socioeconomic career of young white men that are largely independent of social class origins. This was <u>not</u> found to be the case for occupational status, and tends to support Bowles's thesis that an adequate specification of socioeconomic origins (including measures of parental wealth and income) reduces

estimates of the independently enhancing effects of schooling on earnings.

After controlling first for mental ability only (column 3) the unique contribution of schooling ranges from .2-.3(NLS, CPS-NORC I, CPS-NORC-II) to .7 (EEO)(bottom statistic). More consistent and stable estimates of the unique explanatory impact of schooling are presented in column 4. Here we inspect the increment to R^2 by the addition of schooling to the earnings equation containing SES origins and mental ability. Of the total explained variation in earnings, between 14 (CPS-NORC II, logged) and 44 (MICH) percent can be uniquely attributed to schooling. These results are similar to the comparable equation for occupational status. Finally, we estimate schooling's unique contribution to the explanation of earnings after first entering into the regression equation the four SES origin variables and mental ability for the EEO and WISC data sets (column 5). The percent of total explained variation due to that component of schooling that is independent of SES origins and ability is small, around 20 percent. Net of status origins and ability, schooling explains only 1 to 2 percent of the variance in annual earnings (not income). Again, this is consistent with Bowles's (1972) conclusions.

Based on the results presented in Table 4, I conclude that for earnings schooling functions mainly in concert with, rather than independently of, socioeconomic status origins and ability. Perhaps this remark by Bowles (1972: S240) is too strong: "...the educational system is a major vehicle for the transmission of economic status from one generation to the next." Nonetheless, at least for the earnings of relatively young white men (25-34), schooling does not appear to liberate men from their class backgrounds nor does it appear to substantially enhance and explain earnings. The implication

of these findings is that the economic returns to schooling may be nontrivially overestimated in the absence of adequate controls for background and ability. This conjecture is explored in Table 5 below.

Table 5 Here

Table 5 presents the proportional reduction in earnings returns to schooling when controlling socioeconomic origins and/or mental ability. This statistic, the extent of specification bias, is the earnings analog to the statistic presented in Table 3 for occupational status. Column 1 presents the reduction in the schooling coefficient after controlling father's occupation and father's education. Estimates of this bias vary considerably, from .04 (PFS, MICH) to around .25 (EEO, CPS-OCG 45-54). The average estimate would appear to be between .10 and .15.

While a bias of this magnitude is not large, the actual impact in dollars is sizeable. Consider, for example, the bias of .216 for the CPS-OCG 45-54 cohort. One year of schooling is worth $755 for these men. Net of father's occupation and father's education, an additional year of education is worth $592, a difference of $163 a year. Hence, four years of college is worth, annually, $652 less than the bivariate relationship between schooling and income would indicate. The estimate for the EEO data set (metric) is inflated by $84 a year. On the other hand, the return to an additional year of schooling for the WISC men is overestimated by only $26 a year.

The extent of specification bias doubles for the WISC data when further controls for mother's education and parental income are added (see column 2). This increment to the bias is, as I shall show below, due almost entirely to

the parental income variable (see also the discussion in Sewell and Hauser, 1975). For the WISC men, this 19 percent bias translates into $58 a year. Adding parental income and material possessions as further controls in the EEO data set increases the bias by about 50 percent to .37. For the logged EEO earnings data, the bias is .395. Controlling for these four status origin variables reduces the return to a year's schooling by $130 (metric) and 1.2 percent (logged; from 3.0 to 1.8 percent) for the EEO men. Hence, controlling only for socioeconomic status origins, adequately specified, reduces the estimate of the purely economic returns to schooling by between 20 and 40 percent. These data, I believe, strongly support Bowles's contention that returns to education have been inflated due to the omission of a well-specified status origin variable.

Estimates of the returns to schooling are also sensitive to controls for ability (see column 3). The reduction in the size of the schooling coefficient varies from 9 (MICH) to 32 (NLS) percent. In the EEO data, the return to a year's schooling increases because, net of education, ability slightly depresses earnings (see Alexander, Eckland, and Griffin, 1975). With the exceptions of the EEO and CPS-NORC II data, the reduction due to controlling ability only is about twice as great as the comparable reduction due to controlling father's occupation and father's education only. Moreover, for the CPS-NORC I, NLS, and WISC data, the bias in earnings returns due to ability is about twice as great as the comparable bias in occupational status returns (compare columns 3 in Tables 3 and 5).

Controlling for father's occupation, father's education, and mental ability (column 4) reduces the schooling coefficient still further, from about 13 (MICH, EEO) to 37 (CPS-NORC-I) percent. As with occupational status, the biases due to SES origins and ability are almost additive (compare column 4 with columns 1 and 3) and imply that a researcher could not hope to use one variable

as a proxy for the other. For the WISC and CPS-NORC I men, the bias in the earnings equation is about twice as large as the bias in the occupational status equation. For the NLS men, the bias is half again as large. For the EEO men, the biases in earnings and occupational status are very similar (due to the supressor effect of ability on earnings).

Biases on the order of .25 to .35 (as registered in column 4) are certainly not trivial. The standardized effect of schooling on earnings, for the CPS-NORC I men, is reduced from .35 to .22. For the WISC men, the economic return to an additional year of schooling is overestimated by $80 a year. Thus, the degree of specification bias attributed to only three variables -- father's occupation, father's education, and mental ability -- is large enough, in my opinion, to question the utility of estimating simple economic returns to education for white males aged 25-34.

I examine, finally, the bias in economic returns to schooling after adding further controls for material possessions and parental income (EEO) and mother's education and parental income (WISC) in column 5. These data indicate that, for the WISC men, the "payoff" to an additional year of school is reduced by 35 percent, from $314 to $206. This is a reduction of $108 per year. For the EEO men, the return is reduced by 25 percent or $94 a year, from $353 to $259 per year of schooling.

The EEO, NLS, and CPS-NORC I results support, I think, Sewell and Hauser's (1975:185) remark about "the naivete of efforts to measure economic returns to education without controlling socioeconomic background and ability." And both the EEO and the WISC results--demonstrating markedly larger biases after controlling for parental wealth in addition to father's education and occupation--provide adequate support for Bowles's hypothesis discussed in detail above.

Do Socioeconomic Status Origins Directly Influence Earnings?

In equation 11 above, I noted that the economic returns to education would be biased upward only if socioeconomic status origins and/or ability directly affected earnings. It was shown in Table 5 that the returns to schooling are inflated by almost 40 percent, given adequate controls for ability and status origins. The inference, therefore, is that either ability or SES background, or both, register(s) a direct causal impact on earnings. Becker (1972:S252) states that "one must adopt a skeptical attitude [on this contingency] until evidence is provided." Becker also argues that if family background affects earnings it does so primarily by influencing occupational placement. Well, the evidence is now provided, at least for men early in the socioeconomic career, and Becker is wrong on both counts.

Table 6 presents the reduced form and structural estimates of

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Table 6 Here

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socioeconomic status origins, mental ability, schooling, and occupational status on earnings in the EEO and WISC data. The WISC results are taken from Sewell and Hauser (1975: 80-1). Estimates of the structural equation for the EEO men (row 4) suggests that material possessions and parental income are relatively more influential in the determination of earnings than is schooling and of importance equal to occupational status (compare standardized coefficients). The same finding is observed for the WISC men for the parental income variable (row 8). Net of all other variables in the equation, including the achieved educational and occupational statuses, a thousand dollars in parental income is worth about $110 in son's annual earnings for both the EEO and WISC men. Moreover, only 10 percent of the material possessions effect is mediated by ability, schooling, and occupational status and none of the parental income effect is so mediated in the EEO sample (compare rows 1 and 4). Only 18

percent of the parental income effect is mediated by the same variables in the WISC sample (compare rows 5 and 8). Hence, some dimensions of a young man's socioeconomic background, especially those tapping the material resources of parents, (1) appear to directly influence earnings, (2) are as important as occupational status and more important than schooling, and (3) are largely unmediated by the remaining variables in the model. It should be remembered that the dependent variable is earnings, not income.

Becker states (1972) that such results -- if they exist -- may be the result of measurement error. Respondents, he argues, are asked to report on the income of their household while they were adolescents and this may result in errors of recall or deliberate misinformation. Conceivably, this may be true for the EEO data set; it is not a valid criticism of the WISC data however. In that data set, parental income is taken from Wisconsin state tax records and son's earnings are taken from the U.S. Social Security Administration records. Measurement error, in such circumstances, would be minimal. The correlations among the status origin and status destination variables are extremely similar in the EEO and WISC data sets; this external validity check on the accuracy of the EEO data is reassuring. Thus, in my opinion, these effects --first documented in the WISC data and labelled the "direct social inheritance of earnings performance" by Sewell and Hauser (1975:87) -- are not measurement artifacts in the EEO data set.

Conclusions

Several caveats are in order before presenting my concluding remarks. First, this discussion is limited to relatively young white males. Because a sufficient number of comparable analyses have yet to be conducted for blacks and women, the biases in returns to schooling for these populations are unknown. There is reason to believe that SES and ability affect the socioeconomic

achievements of men differently from those of women (Alexander and Eckland,1975; Treiman and Terrell, 1975; Carter, 1972) and those of blacks differently from those of whites (Porter, 1974; Duncan, 1969). Thus, the biases may differ for these populations. This is further evidence, however, of the possibly misleading nature of race or sex comparisons of the returns to years of schooling in the absence of controls for SES and ability. Second, most of the data analyzed here pertain to young workers, a population for which the schooling-earnings correlation is low (Mincer, 1974; Duncan, Featherman, and Duncan, 1972). The biases for more experienced workers may be less severe than those estimated in this paper. Analyses employing well-specified SES origin and ability variables have yet to be conducted for older cohorts of workers, but what evidence we have does not support this hypotheses (compare the results for the four CPS-OCG cohorts in Tables 4 and 5). Finally, as Griliches and Mason (1973) have demonstrated,the introduction of other variables into earning equations reduces the direct effects of father's education, father's occupation, and ability and, therefore, deflates the reduction in socioeconomic returns attributable to these variables. Inclusion of these additional variables, however, is also likely to reduce estimates of the returns to educational attainment; thus, the "true" schooling returns will be, if anything, even smaller than those estimated in this paper. Research thus far conducted with a multitude of other variables --including high school and college "quality," educational and occupational aspirations, academic performance in high school and college, and course of study in college -- have failed, however, to "explain," or even substantially reduce, the parental wealth effect on son's earnings reported in this paper for both the EEO and WISC men (Alwin, Sewell, and Hauser, 1975;

Sewell and Hauser, 1972, 1975, Alexander, Eckland, and Griffin, 1975; Alexander, personal communication). And, as I have demonstrated, the bias attributed to SES can be zero only if the partial regression coefficients linking SES indicators and earnings are zero.

More research on these critical issues clearly is needed; nevertheless, the results presented in this paper suggest that occupational status returns to schooling are not seriously inflated due to the omission of mental ability or socioeconomic status origins. Economic returns to schooling, however, are overestimated by around 40 percent. Simply put, without adequate controls for ability and SES origins, estimates of the earnings "payoff" of formal education for white men early in their occupational careers are seriously biased.

FOOTNOTES

1. For further evidence on the ability-education-income nexus, see Duncan(1968), Hause (1971), Dickenson (1974),Link and Ratledge (1975), Alexander, Eckland, and Griffin (1975), and Jencks,et al (1972).
2. Some sociologists present similar arguments. See, for example, Haug (1973), Haug and Sussman (1971), and Hodge (1970).
3. The traditional practice of excluding SES origins from earnings equations is so deeply entrenched that even for those data sets with such measures available some researchers neglect them (Flanagan,1974).
4. Generally, this paper is based on the reanalysis of published correlations, all of which index only linear and additive associations among the model variables. By necessity, therefore, I must assume linear and additive schooling effects on socio-economic achievement and I must also ignore quality differences in educational returns. Mincer (1974) and Stolzenberg (1975) have demonstrated important non-linear education effects upon earnings and notable schooling-work experience interactions in earnings functions. Moreover, the quality of the schooling experience also may be influential in the production of earnings (Weisbrod and Karpoff,1968; Link and Ratledge,1975;Welch,1973;Alwin,Hauser, and Sewell,1975). To the extent that such complexities have been slighted in my analyses, the importance of schooling will be underestimated. Sewell and Hauser (1975) have, however, considered non-linear schooling influences on earnings and found that such effects contribute little explanatory power. Finally, and again of necessity, I must assume perfect measurement of all variables, thus vitiating part of Bowles's argument.
5. See Deegan (1974) and Duncan (1975) for cogent expositions of the algebra of and types of specification bias.
6. The CPS-NORC II results are anomalous because I use the amount of schooling attained after entrance into the Armed Forces as my measure of educational attainment rather than the total years of schooling completed. The zero-order correlations between this schooling increment (SI) and occupational status and income are only half

as large as those correlations between total educational attainment and socio-economic achievements. Therefore, SI can uniquely explain only half as much variance in either labor market outcome. Because SI was ascertained after the measurement of ability (AFQT), a desirable property not shared by either the CPS-NORC I or MICH data, SI conforms to the theoretical assumptions of the model specified above and is technically the most appropriate measure of educational attainment for the purpose of evaluating biases in schooling returns (see the discussion in Griliches and Mason, 1973). Using the total educational attainment variable in the CPS-NORC II data yields "unique" estimates of the importance of schooling on status and income quite comparable to those obtained with the CPS-NORC I data.

7. It may be, as "human capital" economists argue, that highly educated individuals are potentially (from the employer's perspective) more productive, and thus are more likely to be hired for higher status and higher paying jobs. No concensus exists on this point, however, and several researchers (Gintis, 1971; Berg, 1970; Collins, 1971; Arrow, 1973; Taubman and Wales, 1973) argue that educational credentials signify largely whether a prospective employee has acquired or retained "proper" work attitudes (rather than specific functional skills), and that this is the role of such certification in positioning men in the occupational structure. Layard and Psacharopoulous (1974) summarize the results of several pertinent studies regarding the "productivity" versus the "screening" hypotheses.

8. All estimates of the returns to education reported in this section are estimates of the total effect of education, i.e., directly and indirectly through the placement of men in the occupational structure.

Table 1

Summary of Data Sources and Variables

SAMPLE	AGE	BACKGROUND	SES ORIGINS	ABILITY	OCCUPATIONAL STATUS	EARNINGS
(1) CPS-OCG (1962) (Duncan, et. al., 1972)	25-34 35-44 45-54 55-64	non-Negro non-farm	father's occupation father's education	no	Duncan's SEI	Annual Income
(2) CPS-NORC-I (1964) (Duncan, 1968)	25-34	white	father's occupation father's education	yes (AFQT)	Duncan's SEI	Expected Annual Earnings
(3) CPS-NORC-II (1964) (Griliches and Mason, 1973)	21-34 ($\bar{X}$=29)	96% white, veterans	father's occupation father's education	yes (AFQT)	Duncan's SEI (metric and logged)	Weekly Earnings (metric and logged)
(4) MICH-PANEL* (1968-1972) (Dickinson, 1974)	$\bar{X}$=45	92% white	father's occupation father's education	yes	not available	Hourly Wage
(5) EEO (1970) (Alexander and Eckland, 1973)	≈30	white, non-farm	father's occupation father's education, material possessions, parental income	yes	Duncan's SEI (metric and logged)	Annual Earnings (metric and logged)
(6) NLS (1966) (Kohen, 1971)	18-24	white, attended at least 1 year of high school	father's occupation, number of family members who attended college	yes	Duncan's SEI	Hourly Wage

Table 1 continued

Summary of Data Sources and Variables

SAMPLE	AGE	BACKGROUND	SES ORIGINS	ABILITY	OCCUPATIONAL STATUS	EARNINGS
(7) PFS (1957-1967) (Featherman, 1972)	$\bar{X}$=30	white, native born, SMSA's	father's occupation	no	NORC Prestige	Annual Income
(8) Wisconsin (1957,1964) (Sewell and Hauser, 1972, 1974)	≈25	white, non-farm, high school seniors in Wisconsin	father's occupation, father's education, mother's education, parental income	yes	Duncan's SEI	Average Annual Earnings (1965 to 1967)

*Ability test administered after completion of schooling.

Table 2

Unique Contribution of Schooling to Explained Variance in Occupational Status Controlling for:*

DATA SET	(1) Father's Occupation, Father's Education	(2) Father's Occupation, Father's Education, Parental Income, Mother's Education (WISC), Material Possessions (EEO)	(3) Ability	(4) Ability and (1)	(5) Ability and (2)
CPS-OCG 25-34	.273 (.627)	-----	-----	-----	-----
CPS-OCG 35-44	.259 (.604)	-----	-----	-----	-----
CPS-OCG 45-54	.221 (.598)	-----	-----	-----	-----
CPS-OCG 55-64	.192 (.572)	-----	-----	-----	-----
CPS-NORC-I	.246 (.576)	-----	.215 (.515)	.145 (.334)	-----
CPS-NORC-II(metric)	.051 (.309)	-----	.053 (.310)	.044 (.193)	-----
CPS-NORC-II(logged)	.034 (.265)	-----	.035 (.265)	.028 (.159)	-----
EEO (metric)	.241 (.676)	.256 (.657)	.188 (.548)	.151 (.420)	.152 (.421)
EEO (logged)	.192 (.697)	.188 (.674)	.155 (.584)	.126 (.455)	.128 (.455)
NLS	.089 (.534)	-----	.092 (.575)	.067 (.371)	-----
PFS**	.315 (.743)	-----	-----	-----	-----
WISC	.301 (.763)	.283 (.716)	.256 (.643)	.214 (.528)	.206 (.508)

*The first entry for each data set under each column in the table is the variance explained in occupational status that can be uniquely attributable to education; the entry in parentheses for a data set under each column in the table is the proportion of explained variance in occupational status due to the unique explanatory power of education.

**Father's Occupation only.

Table 3

Percent Bias in Occupational Status Returns to Schooling Controlling for:

DATA SET	(1) Father's Occupation, Father's Education	(2) Father's Occupation, Father's Education, Parental Income, Mother's Education (WISC), Material Possessions (EEO)	(3) Ability	(4) Ability and (1)	(5) Ability and (2)
CPS-OCG 25-34	.089	-----	-----	-----	-----
CPS-OCG 35-44	.098	-----	-----	-----	-----
CPS-OCG 45-54	.097	-----	-----	-----	-----
CPS-OCG 55-64	.131	-----	-----	-----	-----
CPS-NORC-I	.113	-----	.102	.202	-----
CPS-NORC-II(metric)	.130	-----	.119	.196	-----
CPS-NORC-II(logged)	.145	-----	.133	.219	-----
EEO (metric)	.091	.090	.087	.156	.149
EEO (logged)	.082	.080	.061	.126	.118
NLS	.133	-----	.136	.224	-----
PFS*	.068	-----	-----	-----	-----
WISC	.058	.067	.089	.132	.139

*Father's Occupation only.

Table 4

Unique Contribution of Schooling to Explained Variance in Earnings Controlling for:*

DATA SET	(1) Father's Occupation, Father's Education	(1) Father's Occupation Father's Education, Parental Income Mother's Education (WISC), Material Possessions (EEO)	(3) Ability	(4) Ability and (1)	(5) Ability and (2)
CPS-OCG 25-34	.039 (.468)	-----	-----	-----	-----
CPS-OCG 35-44	.059 (.380)	-----	-----	-----	-----
CPS-OCG 45-54	.063 (.399)	-----	-----	-----	-----
CPS-OCG 55-64	.060 (.601)	-----	-----	-----	-----
CPS-NORC-I	.072 (.560)	-----	.043 (.308)	.027 (.188)	-----
CPS-NORC-II(metric)	.017 (.257)	-----	.017 (.285)	.014 (.194)	-----
CPS-NORC-II(logged)	.017 (.241)	-----	.016 (.225)	.014 (.135)	-----
MICH-PANEL	.153 (.717)	-----	.121 (.579)	.101 (.438)	-----
EEO (metric)	.024 (.363)	.017 (.164)	.035 (.724)	.022 (.329)	.018 (.173)
EEO (logged)	.015 (.278)	.011 (.149)	.026 (.745)	.013 (.227)	.013 (.171)
NLS	.015 (.466)	-----	.008 (.221)	.008 (.170)	-----
PFS**	.088 (.796)	-----	-----	-----	-----
WISC	.034 (.784)	.023 (.392)	.021 (.447)	.017 (.343)	.013 (.201)

*The first entry for each data set under each column in the table is the variance explained in earnings that can be uniquely attributable to education; the entry in parentheses for a data set under each column in the table is the proportion of explained variance in earnings due to the unique explanatory power of education.

**Father's Occupation only.

Table 5

Percent Bias in Earnings Returns to Schooling Controlling for:

DATA SET	(1) Father's Occupation, Father's Education	(2) Father's Occupation, Father's Education, Parental Income, Mother's Education (WISC), Material Possessions (EEO)	(3) Ability	(4) Ability and (1)	(5) Ability and (2)
CPS-OCG 25-34	.175	-----	-----	-----	-----
CPS-OCG 35-44	.169	-----	-----	-----	-----
CPS-OCG 45-54	.216	-----	-----	-----	-----
CPS-OCG 55-64	.117	-----	-----	-----	-----
CPS-NORC-I	.123	-----	.268	.369	-----
CPS-NORC-II(metric)	.127	-----	.127	.197	-----
CPS-NORC-II(logged)	.128	-----	.146	.212	-----
MICH-PANEL	.041	-----	.088	.127	-----
EEO (metric)	.241	.368	+.042	.144	.265
EEO (logged)	.295	.395	+.065	.163	.280
NLS	.064	-----	.318	.302	-----
PFS*	.044	-----	-----	-----	-----
WISC	.085	.185	.196	.255	.345

*Father's Occupation only.

Table 6

Reduced Form and Structural Estimates for Earnings (in Dollars)[a]

DATA SET	Father's Occupation	Father's Education	Material Possessions(EEO); Mother's Education(WISC)	Parental Income	Mental Ability	Education	Occupational Status	R^2
EEO DATA (N = 563)								
(1)	10 (.047)	43 (.036)	751* (.147)	.112* (.140)				.0841
(2)	10 (.046)	38 (.031)	726* (.142)	.113* (.140)	25 (.022)			.0846
(3)	5 (.022)	23 (.019)	677* (.132)	.107* (.135)	-54 (-.049)	259* (.162)		.1023
(4)	.75 (.003)	16 (.010)	677* (.132)	.113* (.141)	-79 (-.072)	152 (.095)	33* (.154)	.1181
WISC DATA (N = 2069)								
(5)	1 (.009)	18 (.020)	28 (.030)	.137* (.166)				.0359
(6)	.3 (.002)	.2 (.000)	16 (.018)	.127* (.155)	23* (.130)			.0512
(7)	-1 (-.012)	-12 (-.014)	8 (.009)	.115* (.140)	14* (.081)	206* (.133)		.0640
(8)	-1 (-.020)	-2 (-.017)	7 (.007)	.112* (.136)	12* (.066)	97* (.063)	15* (.131)	.0740

[a] Standardized coefficients in parentheses.
*$p \leq .05$.

APPENDIX A

Consider the following equations.

$$(1)\quad X_2 = \beta_{1\,1} X_1 + e_1$$

$$(2)\quad X_3 = \beta_{2\,1} X_1 + \beta_{3\,2} X_2 + e_2$$

$$(3)\quad X_4 = \beta_{4\,1} X_1 + \beta_{5\,2} X_2 + \beta_{6\,3} X_3 + e_3,$$

where X_1 = SES, X_2 = ability, X_3 = education, and X_4 = occupational status. Next obtain the covariances of X_1 and X_2, X_1 and X_3, X_2 and X_3, and X_3 and X_4.

$$(4)\quad \sigma_{12} = \beta_{1\,1}\sigma_{11} + \sigma_{1e_1}.$$

$$(5)\quad \sigma_{13} = \beta_{2\,1}\sigma_{11} + \beta_{3\,1}\sigma_{12} + \sigma_{1e_2}.$$

Substituting (4) into (5) yields

$$(6)\quad \sigma_{13} = \beta_{2\,1}\sigma_{11} + \beta_{3\,1}\beta_{1\,1}\sigma_{11} + \sigma_{1e_2}.$$

$$(7)\quad \sigma_{23} = \beta_{2\,1}\beta_{1\,1}\sigma_{11} + \beta_{3\,2}\sigma_{22} + \sigma_{2e_2}.$$

$$(8)\quad \sigma_{43} = \beta_{6\,3}\sigma_{33} + \beta_{4\,1}\sigma_{13} + \beta_{5\,2}\sigma_{23} + \sigma_{3e_3}.$$

By assumption, $\sigma_{1e_1} = \sigma_{1e_2} = \sigma_{2e_2} = \sigma_{3e_3} = 0$. Substituting (6) and (7) into (8) yields

$$(9)\quad \sigma_{43} = \beta_{6\,3}\sigma_{33} + \beta_{2\,4}\beta_{1\,1}\sigma_{11} + \beta_{5\,3}\beta_{2\,2}\sigma_{22} + \beta_{2\,1}\beta_{5\,2}\beta_{1\,1}\sigma_{11} + \beta_{4\,1}\beta_{3\,1}\beta_{1\,1}\sigma_{11}.$$

Equation (9) represents the covariance of X_3 (education) and X_4 (occupational status), given equations (1) - (3).

Consider now the "incorrect" occupational status equation, corresponding to equation (8) in the text.

$$(10)\quad X_4 = \beta_{6\,3} X_3 + u_1.$$

Given (10) the covariance of X_3 and X_4 is

$$(11)\quad \sigma_{34} = \beta_{6\,3}\sigma_{33} + \sigma_{3u_1},$$

and $\sigma_{3u_1} \neq 0$. However, OLS estimation of equation (8) assumes $\sigma_{3u_1} = 0$, and

the sample estimate of β_6 is

$$(12)\quad b_6 = \sigma_{34} / \sigma_{33}.$$

However, we know the "true" σ_{34} is expressed by equation (9). Therefore, substituting (9) into (12) yields

$$(13)\quad b_6 = (\beta_6\sigma_{33} + \beta_2\beta_4\sigma_{11} + \beta_5\beta_3\sigma_{22} + \beta_2\beta_1\beta_5\sigma_{11} + \beta_4\beta_1\beta_3\sigma_{11})/\sigma_{33}.$$

If all variables are standardized, $\sigma_{33} = \sigma_{11} = \sigma_{22} = 1$ and the resulting expression is identical to equation (10) in the text. Thus, OLS estimation of (10), or (8) in the text, yields a biased estimate of β_6, the "true" occupational status returns to education. Identical procedures can be used to estimate the bias in earnings returns to schooling. The standardization procedure is employed simply for convenience and in no way affects the estimate of the bias.

APPENDIX B

Data and Variables

1. CURRENT POPULATION SURVEY-OCCUPATIONAL CHANGES IN A GENERATION (CPS-OCG) Survey of March,1962. The data to be reanalyzed here are for non-Negro males of non-farm origin. The results are presented for four age cohorts: 25-34 (N=3141); 35-44 (N=3214); 45-54 (N=2569); 55-64 (N=1482). SES origins are indexed by father's occupation and father's education. Occupational status is measured by Duncan's SEI scale (Duncan,1961). Annual income is used as a proxy for annual earnings. No measure of ability is available. Correlations are from Duncan, Featherman, and Duncan (1972).
2. CURRENT POPULATION SURVEY-NATIONAL OPINION RESEARCH CENTER (CPS-NORC I) Survey of October,1964. The data are for white males of farm and non-farm origin, 25-34 years of age (N=3000). SES origins are measured by father's occupation and father's education. Mental ability is assessed by the Armed Forces Qualification Test (AFQT). Occupation status is that of Duncan's SEI scale. Earnings refer to expected earnings in 1964. Correlations are reported in Duncan (1968).
3. CPS-NORC II Survey of October,1964. This is a subsample of (2) above and pertain to 1454 veterans between the ages of 21 and 34 ($\bar{X}$=29). Ninety-six percent of the sample is white. All variables are measured as in (2), except that weekly earnings are employed. Most correlations are reported in Griliches and Mason (1973).
4. UNIVERSITY OF MICHIGAN -SURVEY RESEARCH CENTER'S "PANEL STUDY OF INCOME DYNAMICS" (MICH-PANEL) for the years 1968-1972. The data are for male heads of households, with a mean age of 45. Ninety-two percent are white (N=2186). SES origins are measured by father's occupation and father's education. Occupation was presented (in the report) as a series of dummies and is nct used here. Ability was measured by a test administered by the SRC interviewers. Earnings are hourly wages. Correlations are from Dickinson (1974).

5. EXPLORATIONS IN EQUALITY OF OPPORTUNITY (EEO) Survey of 1970. The subsample to be studied here are white males of non-farm origin, all with an approximate age of 30 in 1970 (N=563). SES origins are indexed by father's occupation, father's education, parental income when the respondent was in high school, and a 13 item factor weighted acquisition index of possessions in the respondent's high school household. Ability is assesses by a 20 item test administered by ETS in 1955, when the respondents were sophomores in high school. Occupational status is assessed by Duncan's SEI measure. Earnings are annual earnings for 1969. Correlations among all of the variables have not been published;see Alexander and Eckland (1973)for sampling and measurement details and Alexander,Eckland, and Griffin (1975) for analyses of the earnings data.
6. NATIONAL LONGITUDINAL SURVEY (NLS) of 1966. The data pertain to 669 respondents who were employed in the civilian labor force, were not enrolled in school, and had attended at least the first year of high school. SES origins are measured by the number of family members who ever attended college and father's occupation. Ability scores were taken from school recordes. Occupational status is assessed by Duncan's SEI scale, while earnings are hourly wage. Correlations are reported in Kohen (1971).
7. PRINCETON FERTILITY STUDY (PFS) of 1957-1967.These data are limited to 715 male members of native white couples residing in seven of the largest SMSA's in the U.S. over the years 1957-1967. Occupational status is coded in NORC prestige scores (NORC,1947). Earnings are assessed by reported income in 1957. No measure of ability is available. Correlations are from Featherman (1972).
8. WISCONSIN Surveys (WISC) of 1957 and 1964. The sample, 2069 Wisconsin seniors in 1957, is almost exclusively white and was around 25 years of age in 1964 (when occupational status was measured). SES origins are measured by father's education, father's occupation, mother's education. and average parental income over the years

1957-1959. Ability is measured by the Henmon-Nelson test, administered yearly to all Wisconsin juniors. Occupational status is index by Duncan's SEI. Earnings are based on a canonically weighted average of annual earnings for the years 1965,1966, 1967, when the respondents were about 27 years of age. Correlations are reported in Sewell and Hauser (1975).

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